



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/567,178

02/03/2006

Erlind M. Thorsteinson

62562A

6741

35503

7590

10/14/2008

Union Carbide Chemicals and  
Plastics Technology Corporation  
P.O. Box 1967  
Midland, MI 48641-1967

EXAMINER

MICALI, JOSEPH

ART UNIT

PAPER NUMBER

4181

MAIL DATE

DELIVERY MODE

10/14/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/567,178	<b>Applicant(s)</b> THORSTEINSON ET AL.	
	<b>Examiner</b> JOSEPH V. MICALI	<b>Art Unit</b> 4181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-105 is/are pending in the application.
- 4a) Of the above claim(s) 11, 12 and 16-105 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 13-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :10/5/07, 7/30/07, 4/17/07, 7/3/06.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-10 and 13-15, drawn to a method of preparing a catalyst and modified carrier to be used for the vapor phase epoxidation of alkene.

Group II, claim(s) 11-12, drawn to a catalyst and modified carrier to be used for the vapor phase epoxidation of alkene.

Group III, claim(s) 16-35, 37-75, and 77-105, drawn to a method for the epoxidation of an olefin.

Group IV, claim(s) 36 and 76, drawn to a method for producing 1,2-diol, a 1,2-diol ether or an alkanolamine.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Lack of unity of invention may be directly evident “a priori,” that is, before considering the claims in relation to any prior art, or may only become apparent “a posteriori,” that is, after taking the prior art into consideration. For example, independent claims to A + X, A + Y, X + Y can be said to lack unity a priori as there is no subject matter common to all claims. In the case of

Art Unit: 4181

independent claims to A + X and A + Y, unity of invention (i.e. species) is present a priori as A is common to both claims.

In the instant, there is no common element among the four inventions; hence, a priori case. They are all distinctly separated in order of the three different processes. First are the steps to make a catalyst and carrier. Second is a catalyst and carrier. Third are the steps to epoxidize an olefin using a catalyst and carrier. Finally is the process for producing 1,2-diol or the like using an olefin oxide made by epoxidation. The four inventions run consecutively, one after another, but they are disconnected. For example, there is no common subject matter if one compares Group I and Group IV, or even Group I and Group III. Thus, the inventions lack unity and properly subject to restriction requirement.

2. During a telephone conversation with Lois K. Ruzala on September 10<sup>th</sup>, 2008, a provisional election was made without traverse to prosecute the invention of Group 1, claims 1-10 and 13-15. Affirmation of this election must be made by applicant in replying to this Office action. Claims 11-12 and 16-105 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Rejoining Practice***

4. The examiner has required restriction between product and process claims.

Art Unit: 4181

Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined. In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

#### ***Status of Application***

Claims 1-105 are pending. The non-elected claims 11-12 and 16-105 have been withdrawn in lieu of an oral election of the Group I invention. Thus, Group I, claims 1-10 and 13-15(elected), are presented for examination.

***Specification***

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to because of the usage of "said". Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 13, the use of "platelet/fluoride-containing type alumina" is indefinite as to whether the forward slash represents an "and" or an "or" conjunction. Therefore,

Art Unit: 4181

one would not know what the metes and bounds of the claims are. Examination will presently continue with the use of a forward slash as an “or” conjunction.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**9. Claims 1, 5-7, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerdes et al.(US 5,733,842).**

With respect to claim 1, Gerdes recites a method of preparing a catalyst carrier by impregnating a preformed alpha-alumina carrier, which has been subjected to calcining and optionally, other preforming treatments, as part of a preforming process, with at least one modifier selected from among alkali metal silicates and alkaline earth silicates (**claim 1, column 11, line 60 – column 12, line 8**). Gerdes also recites drying the impregnated carrier (**claim 1, column 12, lines 9-10**). Gerdes also recites calcining the dried carrier (**claim 1, column 12, lines 11-12**), where "firing" is synonymous with "calcining" as stated in the specification of Gerdes (column 5, line 39 – column 6, line 5).

With respect to claim 5, Gerdes recites a method of preparing a catalyst after forming the carrier by depositing silver catalytic material (**column 7, line 66 – column 8, line 19**).

With respect to claim 6 and 7, Gerdes recites at least one efficiency enhancing promoter selected from a group consisting of at least one alkali metal, alkaline earth metal, or oxyanion of an element (other than oxygen) having an atomic number of 5 to 83 and being selected from



Art Unit: 4181

groups 3b through 7b and 3a through 7a of the periodic table deposited on the preformed alpha-alumina (**claim 1, column 11, line 60 – column 12, line 8**).

With respect to claim 10, Gerdes recites a method of preparing a catalyst carrier or catalyst where the alkene is ethylene (**column 7, line 62 – column 8, line 7**).

All the claimed elements are well taught by the cited reference, and thus all claims are anticipated and properly included in this rejection.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 4181

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**13. Claim 2-3 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerdes et al (US'842) as applied above, in view of Mikawa et al. (EP 1086743).**

Gerdes' teaching is mentioned above in 102 rejection(supra).

With respect to claims 2-3, Gerdes further teaches a method of making a porous catalyst carrier comprising the steps of impregnating a preformed alpha-alumina carrier with alkaline earth metal silicate modifier, drying the impregnated carrier, and calcining the dried carrier.

However, Gerdes does not teach the selection of a modifier from the group of sodium silicates, lithium silicates, and potassium silicates, or mixtures thereof. Furthermore, it does not teach a sodium silicate modifier with stoichiometry,  $\text{Na}_2\text{O}-2.6\text{SiO}_2$ .

Mikawa teaches a method of making a catalyst for the production of epoxides by a vapor-phase oxidation of an unsaturated hydrocarbon, wherein a sodium silicate modifier along with an alpha-alumina carrier is used (**claim 8**). The modifier may be sodium silicate with a stoichiometry of  $\text{Na}_2\text{O}-2.6\text{SiO}_2$  (**claim 4**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the method of Gerdes using sodium silicates (alkali metal silicates) in place of magnesium and calcium silicates (alkaline metal silicates). The suggestion or motivation for doing so would have been to provide a functional equivalent and "express suggestion to substitute one equivalent for another need not be present to render such substitution obvious" as stated in **MPEP 2143(B)**.

Art Unit: 4181

With respect to claims 13-14, Gerdes teaches an alpha-alumina carrier of platelet morphology (**column 5, lines 39-43**) with alumina at least 95% by weight (**first table of column 7**), with a surface area at least  $0.5 \text{ m}^2/\text{g}$  (**column 5, lines 58-62**) and a pore volume at least  $0.5 \text{ cc/g}$  (**column 5, lines 58-62**).

Gerdes doesn't explicitly teach a median pore diameter between about 1 to 25 microns.

Mikawa recites a catalyst with a median pore diameter between 1 and 25 microns (**claim 3**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the process set forth by Gerdes using the specified median pore diameter. The suggestion or motivation to do so would have been to specify a pore diameter required by Gerdes but not disclosed.

With respect to claim 15, Gerdes explicitly teaches a method that ends with the calcination of the dried carrier

Gerdes does not expressly teach that the carrier is washed after calcination.

Mikawa teaches washing a modified carrier after calcination (**example 1 of Mikawa, page 11, lines 13-15**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the process set forth by Gerdes including a washing step after calcination. The suggestion or motivation to do so would have been to remove impurities from the carrier.

Art Unit: 4181

**14. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,733,842 by Gerdes et al, as applied to claims 1, 5-7, and 10 above, and further in view of US Patent No. 6,103,916 by Takada et al.**

With respect to claim 4, Gerdes teaches a method of making a porous catalyst carrier comprising the steps of impregnating a preformed alpha-alumina carrier with alkaline earth metal silicate modifier, drying the impregnated carrier, and calcining the dried carrier.

Gerdes does not teach a drying conducted at a temperature not exceeding about 250 °C for at least the first two hours following impregnation.

Takada is drawn to an alpha-alumina silver catalyst for the production of ethylene oxide and the method of production.

Takada teaches a drying following impregnation at a temperature range of 100-400°C (**claim 8**), and specifically, a drying not exceeding 250°C for two hours (**column 3, lines 39-51**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the method of Gerdes including the drying being performed at 250°C in view of Takada. The suggestion or motivation for doing so would have been to provide an operating temperature required by Gerdes but not disclosed.

**15. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Gerdes et al (US'842) as applied above, in view of Thorsteinson et al.( EP 0480537).**

With respect to claims 8-9, Gerdes teaches a method of making a porous catalyst carrier comprising the steps of impregnating a preformed alpha-alumina carrier with alkaline earth metal

Art Unit: 4181

silicate modifier, drying the impregnated carrier, and calcining the dried carrier. It also teaches at least one efficiency enhancing promoter deposited on the preformed alpha-alumina.

Gerdes does not explicitly teach an efficiency enhancing promoter being a salt of a member of a redox-half reaction pair, nor a specific promoter component including rhenium.

Thorsteinson is drawn to a stable alkylene oxide catalyst, with shared inventors of the current application

Thorsteinson recites the inclusion of an efficiency enhancing promoter being a salt of a member of a redox-half reaction pair (**claim 1**) as well as rhenium (**claim 1**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the method of Gerdes with the addition of a salt of member of a redox-half reaction pair or a rhenium component as an efficiency enhancing promoter. The suggestion or motivation to make this connection is to improve vapor phase epoxidation (US **Patent No. 5,440,058 to Hoffman et al, column 3, line 57 – column 4, line 12**):

### ***Conclusion***

16. The claims 1-10 and 13-15 are not allowed.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH V. MICALI whose telephone number is (571)270-5906.

The examiner can normally be reached on Monday through Friday, 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, VICKIE KIM can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 4181

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JM/

/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4181